NASA Earth

Applied Sciences Program

NASA Earth Science
Applied Sciences Program

Lines of Business

Innovative & Practical Applications

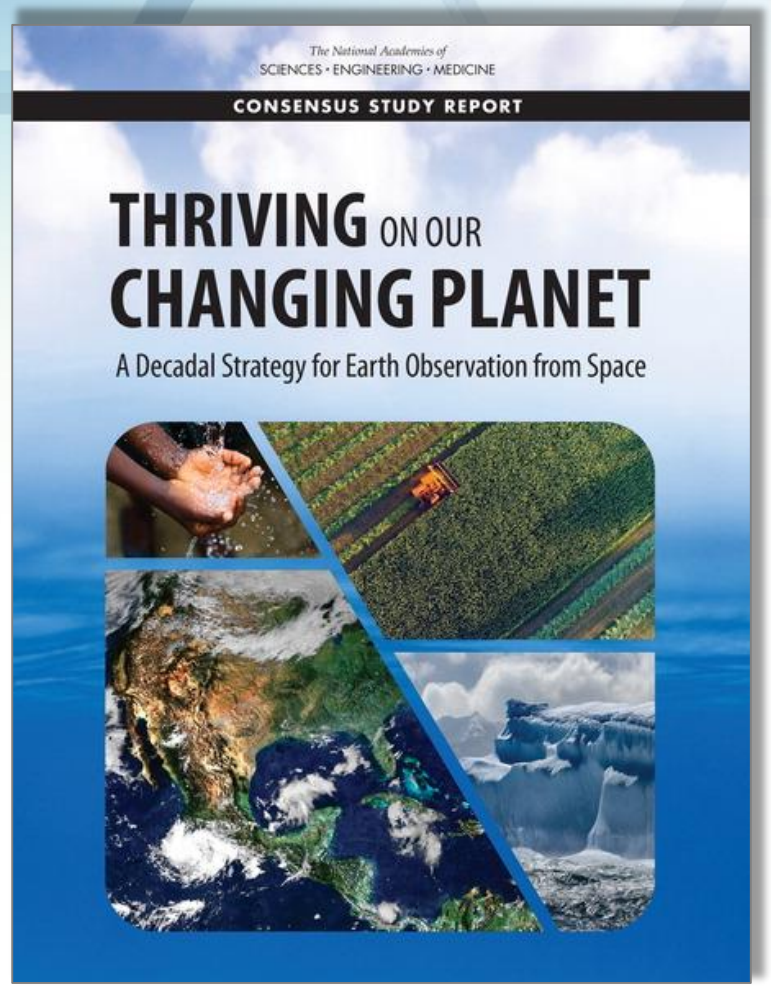
Develop, prove-out, and transition uses

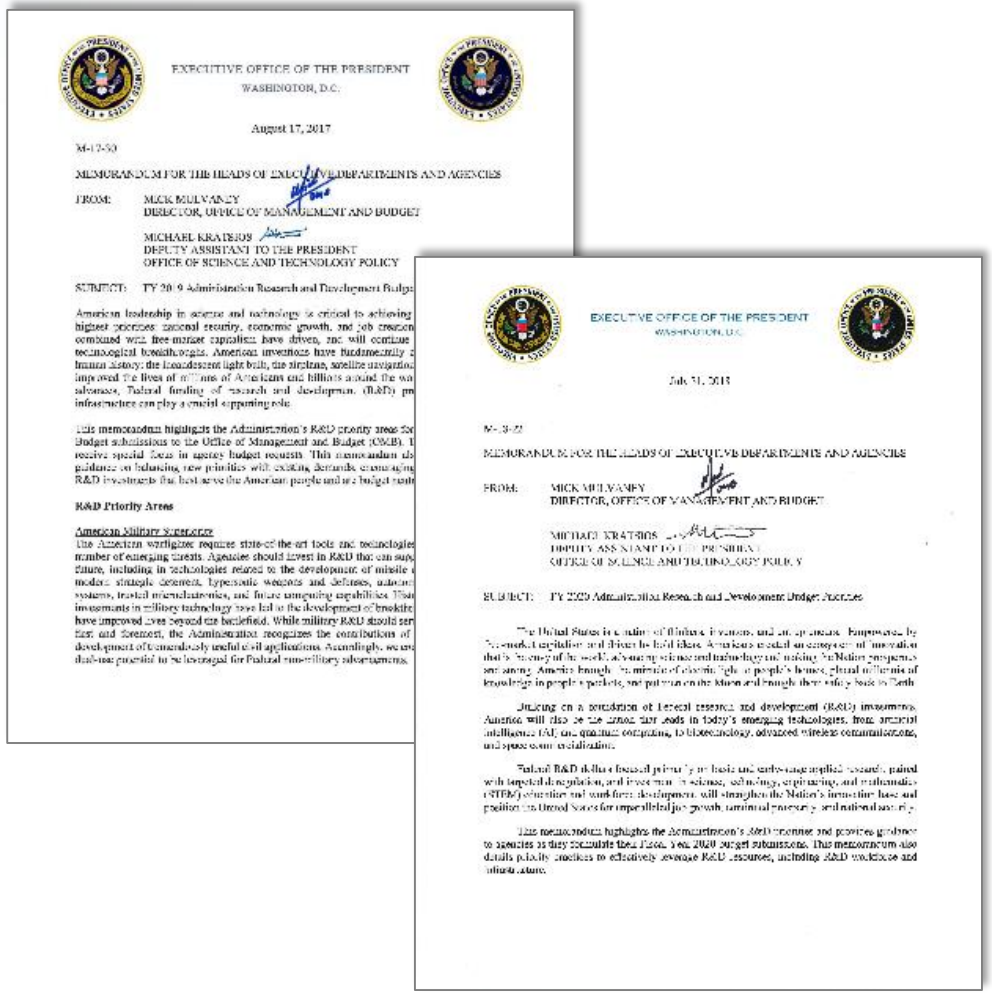
Capacity Building

Build capabilities in US and developing countries

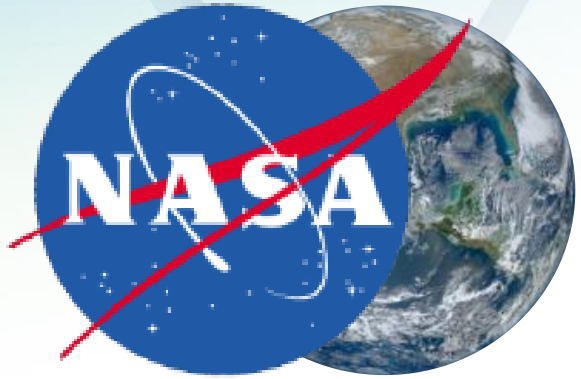
Mission Planning

Support applications throughout mission lifecycle





OMB/OSTP R&D Priority Memos (FY19 & FY20)



NASA Earth Science
Applied Sciences Program

Agility & Flexibility

Replication

Private Sector

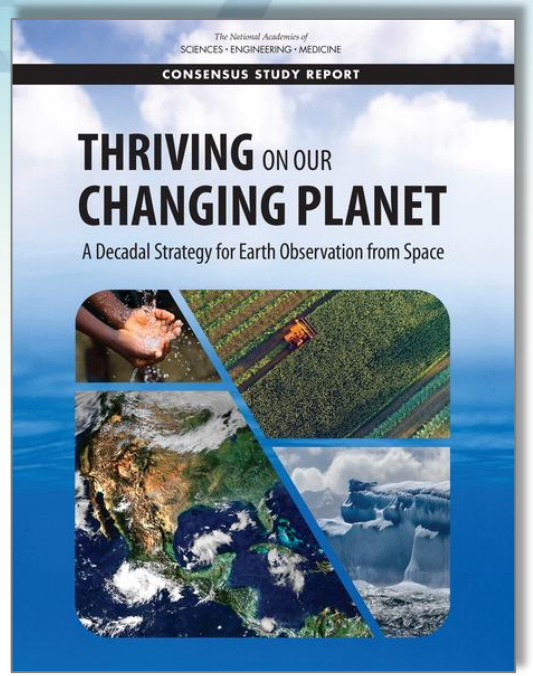
Communications

Earth Decadal Survey

Applied Sciences Communications Strategy

Earth Decadal Survey

NASA
Earth Science

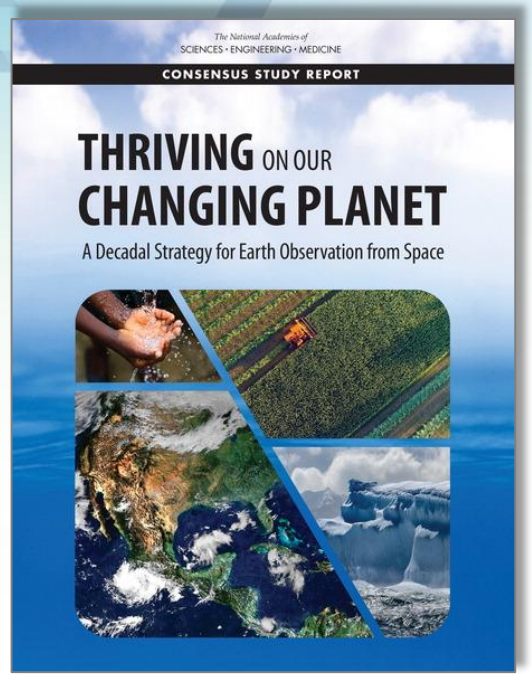


Final Report
Released 2019

	ELEMENTS OF DECADAL STRATEGY
I.	Embrace **Innovative Methodologies** for Integrated Science/Applications
II.	Commit to **Sustained Science and Applications**
III.	Amplify the **Cross-Benefit of Science and Applications**
IV.	Leverage **External Resources and Partnerships**
V.	Institutionalize **Programmatic Agility and Balance**
VI.	Exploit **External Trends** in Technology and User Needs
VII.	Expand Use of **Competition**
VIII.	Pursue **Ambitious Science**, Despite Constraints

Earth Decadal Survey

NASA
Earth Science



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VII.	Expand Use of **Competition**
VIII.	Pursue **Ambitious Science**, Despite Constraints

"[Programs] with both science and applications elements need to explicitly identify the connection, and define opportunities to amplify the cross-benefit, and organization structures and processes need to be adapted when possible to integrate, rather than segregate, science and operations/applications"

"*Agility* in programmatic structures, and in the authorities of staff who implement programs, is essential to respond to new discoveries and emerging needs …"

Earth Decadal Survey

NASA
Earth Science

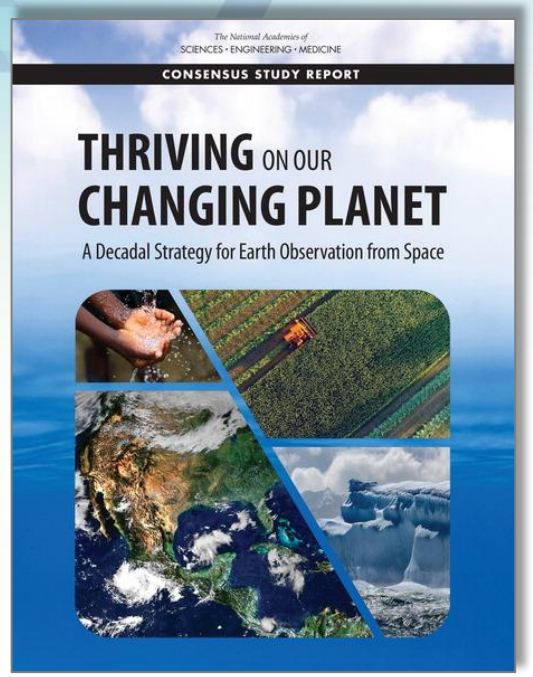

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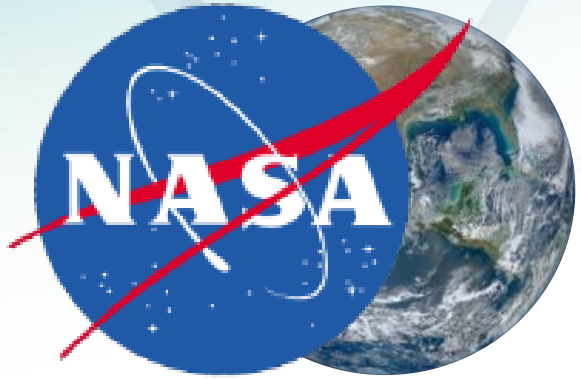
TABLE 3.2 Science and Applications Priorities for the Decade 2017-2027—The Science and Applications Portion of the Full Science and Applications Traceability Matrix (SATM) in Appendix B

GLOBAL HYDROLOGICAL CYCLES AND WATER RESOURCES PANEL

Societal or Science Question/Goal	Earth Science/Applications Objective	Science/ Applications Importance
QUESTION H-1. How is the water cycle changing? Are changes in evapotranspiration and precipitation accelerating, with greater rates of evapotranspiration and thereby precipitation, and how are these changes expressed in the space-time distribution of rainfall, snowfall, evapotranspiration, and the frequency and magnitude of extremes such as droughts and floods?	**H-1a.** Develop and evaluate an integrated Earth system analysis with sufficient observational input to accurately quantify the components of the water and energy cycles and their interactions, and to close the water balance from headwater catchments to continental-scale river basins.	Most Important
	H-1b. Quantify rates of precipitation and its phase (rain and snow/ice) worldwide at convective and orographic scales suitable to capture flash floods and beyond.	Most Important
	H-1c. Quantify rates of snow accumulation, snowmelt, ice melt, and sublimation from snow and ice worldwide at scales driven by topographic variability.	Most Important



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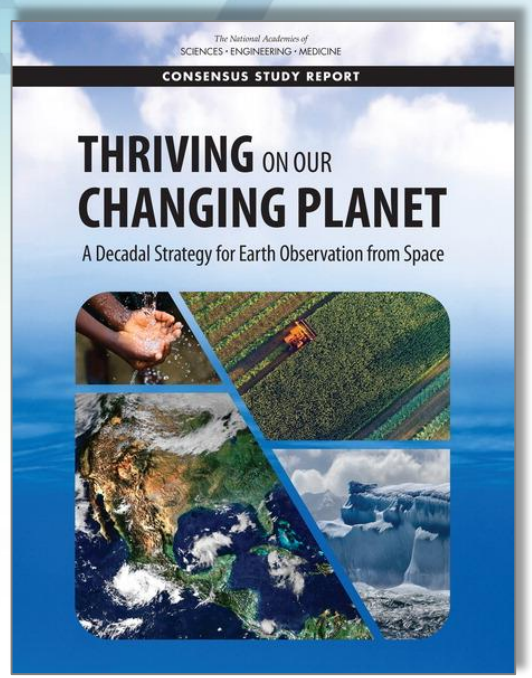

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Early-Stage Ideas

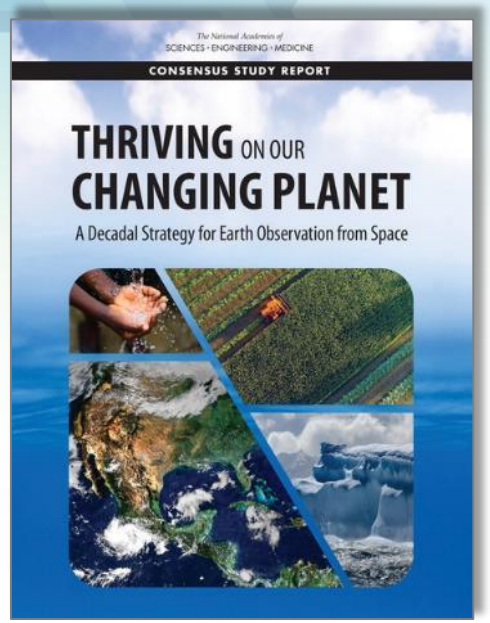
Opportunities for future investment (Chapter 4)

"… The final missing piece of applications research in the agencies is the very initial phase of creating applications—supporting studies that have an idea about how an application might work, and then attempting to create a community for it, and demonstrate its utility.

To expand the potential applications of Earth observations, it would be beneficial to support "proof-of-concept" application studies. Investigators could propose research to evaluate potential data applications, whether a preliminary idea, or a more mature approach to expand the use of remote sensing data."

Applications & Non-Public Sector

NASA
Earth Science



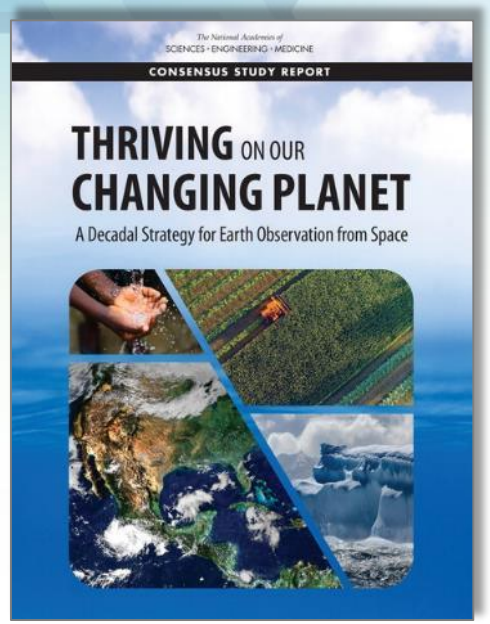
Strategy Element 5

"NASA, NOAA, and USGS will need to make both large and small programmatic adjustments over short time periods. *Agility* in programmatic structures, and in the authorities of staff who implement programs, is essential to respond to new discoveries and emerging needs, particularly in the context of resource constraints. At the same time, achieving and maintaining *programmatic balance* is critical to successful programs.

"Agility and balance do not emerge naturally in organizations. They must be explicitly built into the cultures and processes or they risk being overcome by bureaucracy."

Applications & Non-Public Sector

NASA
Earth Science



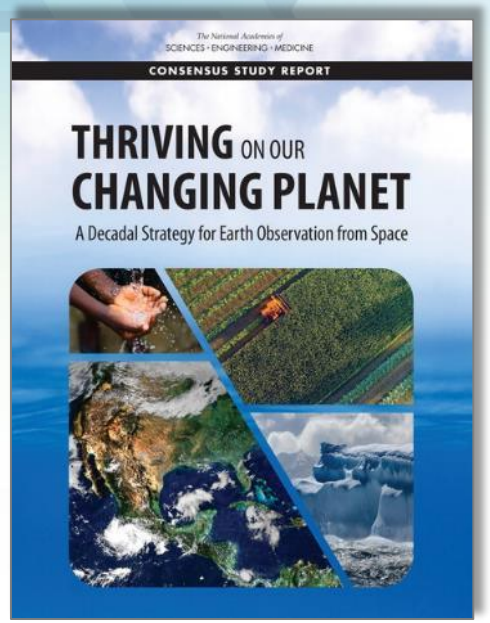
Strategy Element 4

"NASA, NOAA, and USGS have long-established partnerships with non-U.S. space agencies and other organizations, which have already
proven highly valuable in bringing additional resources to address their missions … "

"Today, there is a strong need to build on and extend those partnerships, and to bring in innovative new partnerships …"

Applications & Non-Public Sector

NASA
Earth Science



Strategy Element 6

"For NASA, NOAA, and USGS, a successful process for exploiting external trends might include, at minimum, a survey of:

a) advances in scientific methodologies from outside these agencies;

b) commercial methods for characterizing the diverse applications and information end-uses of data;*

…

f) non-traditional partnerships such as philanthropists and non-profits;

g) innovation in public-private partnerships"

* For example, Item (b) reflects the fact that there are so many end-uses of NASA/NOAA/USGS data that the agencies no longer can simply track straightforward metrics like grants or website data requests to know how their data are used.

Applications & Non-Public Sector

NASA
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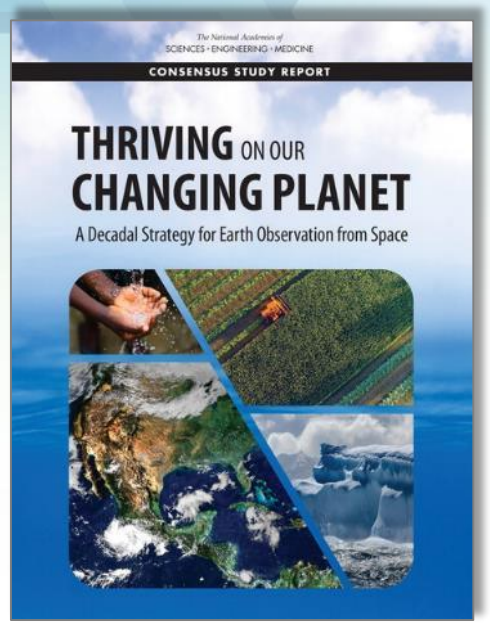

Strategy Element 2

"Accelerated applications: Accelerating the conversion of science into societal benefits amplifies the societal impact. Candidates include: a) applications included from the early stages of observation planning and development, b) rapid applications prototyping, c) rapid transition from science to applications, and d) promoting the science of applications, to advance applications methodologies (Dozier and Gail, 2009)."